DESCRIPTIONS OF THE FEMALE, NYMPH, AND VARIATION IN MALE CHARACTERS OF THE STONEFLY *LEUCTRA SZCZYTKOI* (PLECOPTERA: LEUCTRIDAE)[1]

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ABSTRACT: *Leuctra szczytkoi* until recently was known only from the holotype male collected from Schoolhouse Springs of northcentral Louisiana. Collections in the late fall and winter of 1993-1995 provided additional specimens for describing the variation in the male characters and primary descriptions of the female and nymph of this species of the *Leuctra ferruginea* species group. Males are separated from all others in the group by a combination of a prominent subapical specillium spine, paraprocts and specillia being subequal, and by a triangular specillium. Females were distinguished by a shallow u-shaped notch on the subgenital plate. Nymphs apparently differ from others in the group by lacking sternal bristles anterior to segment 8. *Leuctra szczytkoi* is endemic to central and northcentral Louisiana in slow-flowing, lowland headwater streams of the Red River drainage.

Leuctra szczytkoi Stark and Stewart (Stark and Stewart, 1981) is a member of the *L. ferruginea* (Walker) species group. Members of this group have tapering specillia, often with one or more subapical spines of various lengths. Other members include *L. paleo* Poulton and Stewart, *L. crossi* James, *L. ferruginea* (Walker), *L. rickeri* James, and *L. alabama* James (James, 1974 and 1976; Poulton and Stewart, 1991). Since the original description of *L. szczytkoi* from a male specimen collected in Louisiana (Stark and Stewart, 1981), no additional records of this species have been published. Attempts to collect additional specimens initially concentrated around the March collection date and the remote Schoolhouse Springs site in Jackson Parish where the holotype was collected. This site, now owned by the Nature Conservancy, was described by Morse and Barr (1990).

A series of males, females, and nymphs from several Louisiana streams south of the type locality were recently collected by R. E. DeWalt. These collections enable the authors to describe the female and nymphal stages and also allow for additional information on variation in the male.

Leuctra szczytkoi Stark and Stewart

Leuctra szczytkoi Stark and Stewart, 1981, holotype male, Schoolhouse Springs, Jackson Parish, Louisiana.

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Male. – Forewing length 6-7 mm. Tergum 7 with at most slightly thickened process on the mid-anterodorsal line. Tergum 8 with basal sclerotized band expanded medially into at most slightly elevated process which varies from rounded to triangular in outline (Fig. 1). Vesicle on sternum 9 triangular in outline (Fig. 2). Paraprocts slightly shorter than specillia, ventrolateral aspect with weak basal keel (Figs. 1, 3). Ventrobasal aspect of specillia angular and giving nearly pyramidal appearance, medial edges divergent.

Female. – Forewing length 8 mm. Sclerites on sterna 7 and 8 connected by pair of obscure lateral bridges. Lobes of subgenital plate truncate, notch shallow and u-shaped. Intersegmental membrane of sternum 9 with pair of small, basal sclerites (Fig. 4).

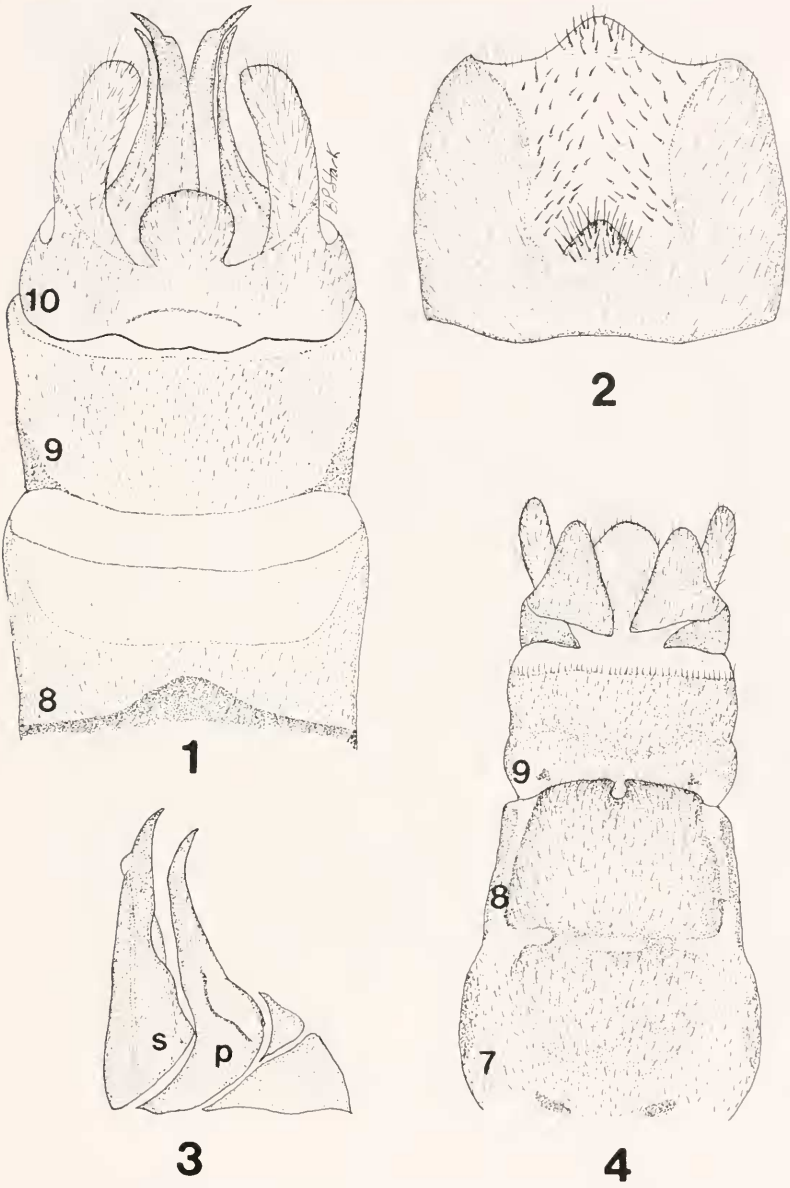
Nymph. – Body length 5-6 mm. General color pale brown, occiput with obscure mottled areas (Fig. 5). Post-ocular bristles 2, lower frontal and anterior clypeal bristles 1 each. Right and left anterior pronotal bristles 6-7 each, length variable; 2 posterior pronotal bristles located forward of posterior angles. Anterolateral mesonotal tuft with 8 short bristles; 6 outer marginal mesonotal bristles located at wing pad base; pair of fine bristles on posterodorsal margin of mesonotum; inner marginal mesonotal bristles absent (Fig. 5).

All terga of abdomen with band of short bristles extending to near pleura; abdominal sterna 8 and 9 each with single long posterior bristle in lateral aspect; sternal bristles absent on more anterior segments (Fig. 6). Basal cercal segments with apical whorls of moderately long bristles, mesal segments with progressively longer bristles through segment 14; apical segments with few, short bristles in apical whorls. Cercal segments present 20-22 (Fig. 7).

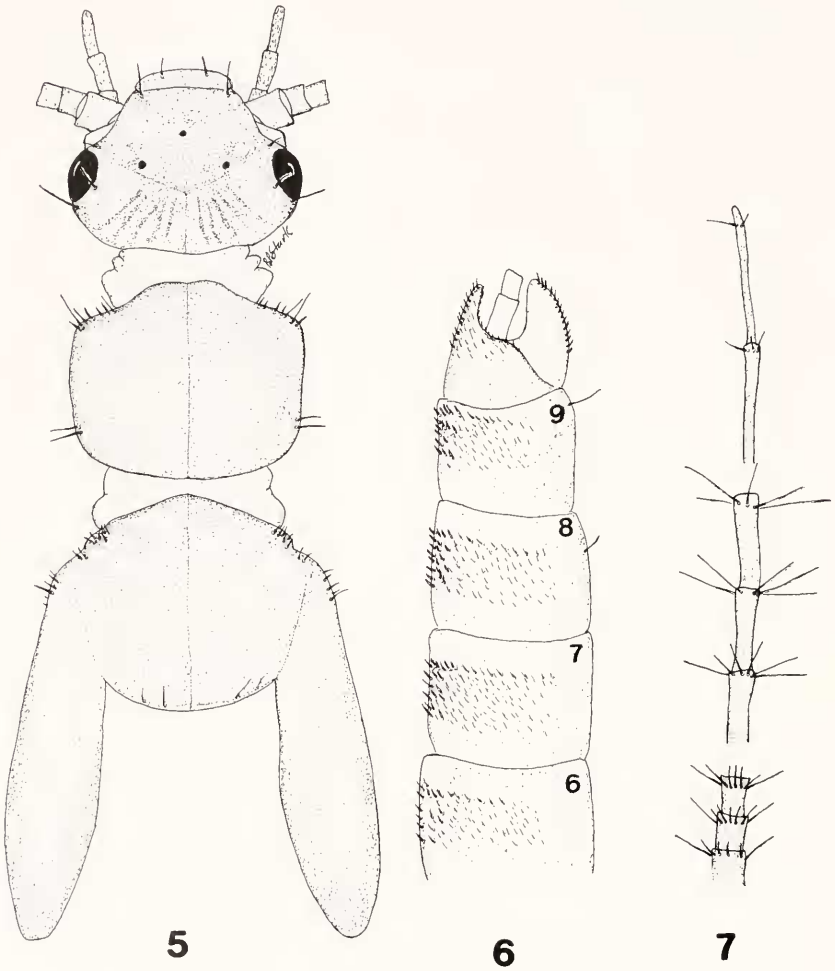
Distribution and ecology. – Additional collections (Table 1) seem to limit the geographical distribution of *L. szczytkoi* to lower elevations (21 to 46 m asl) of Omernik's (1987) South Central Plains Ecoregion (SCPE) in central and northern Louisiana (Fig. 8). Collections to date have been from west of the Mississippi River in 1 to 5 m-wide, first and second order drainages of the Red River basin (Fig. 8). Efforts to locate this species in the upland areas further west of recent localities, and to the east of the Mississippi River, have been unsuccessful. *Leuctra rickeri* and possibly an undescribed species in the group have recently been collected from Washington Parish, in eastern Louisiana.

Slopes of the streams in the vicinity of recent collections were 1.3 m/km for Loving Creek, 1.6 m/km for Jordan Creek, and 2.79 m/km for Beaver Creek. Substrates in these streams consisted of mostly sand, small amounts of fine gravel, and abundant woody debris. Natural riparian vegetation included bald cypress, oaks, shortleaf pine, and various ericaceous shrubs. These streams exhibited dark tea-colored water, accumulations of fine brown organic matter, and an abundant aufwuchs (attached microbial) community. Springs were common along the banks of these streams, as described for the type locality by Morse and Barr (1990). These descriptions are also consistent with Hitchcock's (1974) assertion that leuctrids prefer small, slow-flowing streams. The threatened Louisiana pearlshell mussel, *Margaritifera hembeli* (Conrad) also occurs at the sites of the 1993-1995 collections (P. D. Johnson, pers. comm.).

The emergence of adults at the sites listed in Table 1 was well under way by late October. Pre-emergent nymphs of *L. szczytkoi* were collected from leafpacks associated with wood. Exuviae were left near the water's edge on emergent woody substrates. Adults were often collected from just above the water level



Figs. 1-4. *Leuctra szczytkoi*, adult features. 1. Male terminalia, dorsal. 2. Male eighth sternite. 3. Male ventrolateral aspect of left specillium (s) and paraproct (p). 4. Female terminalia, ventral.



Figs. 5-7. *Leuctra szczytkoi*, nymphal features. 5. Head, pronotum, and mesonotum. 6. abdominal segments 6-10, lateral. 7. Right cercus, lateral.

on the undersides of wood or from dry leafpacks. Hand picking adults from the stream margin was more effective than using a beating sheet in riparian shrubs. This species may prefer to remain low in the vegetation rather than climb shrubs.

DISCUSSION

Males in this sample had a more rounded lobe on tergum 8, whereas the holotype had a triangular lobe (see Fig. 1 in Stark and Stewart, 1981), otherwise the holotype and these additional males were indistinguishable. *Leuctra paleo* and *L. szczytkoi* appeared to be indistinguishable using descriptions in the literature (Stark and Stewart, 1981; Poulton and Stewart, 1991), this coupled with their ranges in the SCPE and emergence beginning in October, necessitated examination of the holotypes. *Leuctra paleo* differed by having a more acute specillium spine, a rounded outline for the specillium, and by having parallel medial sides of the specillium.

Leuctra ferruginea and *L. rickeri* possess only small, and sometimes inconspicuous, spines atop the specillium. Their paraprocts are shorter than the specillia. *Leuctra alabama* may possess these spines, but its paraprocts and specillia are subequal in length (James, 1974 and 1976).

Females in this sample were also distinct from other members of the *ferruginea* group. Poulton and Stewart (1991) show that subgenital plate lobes

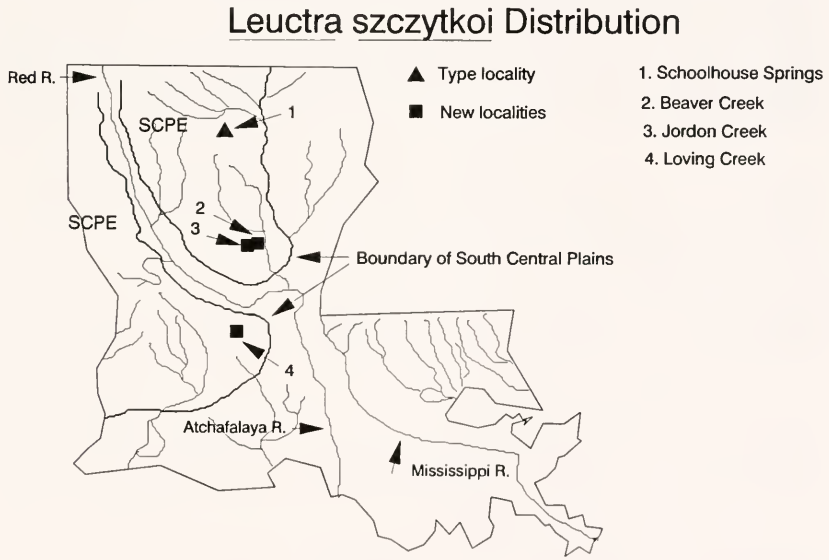


Fig. 8. Distribution of *Leuctra szczytkoi* in Louisiana. SCPE = South Central Plains Ecoregion.

of *L. paleo* are rounded, with an evenly curving median notch. James (1974, 1976) illustrates other members of the group as having truncate to broadly rounded lobes of the subgenital plate with deep parabolic notches.

Nymphs were quite similar to *L. ferruginea* and could be determined as this species by using keys in Harper and Hynes (1971). The two species appeared to be distinct in the nymphal stage because *L. szczytkoi* lacked sternal bristles anterior to segment 8 (see Fig. 17 in Harper and Hynes, 1971). Due to the fragile nature of these bristles, a larger sample size of mature nymphs would be needed to confirm this character.

Leuctra szczytkoi emerged in October, with most nymphs having transformed shortly thereafter. The scattered January records and the late March collection date for the holotype suggested that *L. szczytkoi* exhibited an extended emergence throughout the fall and winter. In contrast, most species of the *L. ferruginea* group emerge in spring and summer (Harper and Hynes, 1971; James, 1974 and 1976).

The Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, has designated this species as S1, meaning that it is critically imperiled due to its extreme rarity, being known from five or fewer extant populations (S. H. Shively, pers. comm.). This ranking was given because the only published record of its occurrence was from Schoolhouse Springs. The status might well be downgraded to S3, a species found in a restricted region of the state, but locally abundant where found.

Table 1. Localities and collection information for *Leuctra szczytkoi* collected from Louisiana. N = number of nymphs collected.

Stream	Parish	Dates D-M-Y	Latitude Longitude	Transect Range, Section	Specimens
Schoolhouse Springs	Jackson	30-III-73	32°28.63'N 92°25.48'W	T17N R1W S12	♂
Beaver Creek	Grant	24-X-93	31°36.60'N 92°36.10'W	T7N R2W S5	♂ 3N
		30-X-93			2♂ 3♀
		24-I-94			♀
Jordan Creek	Grant	30-X-93	31°31.17'N 92°31.79'N	T6N R2W S12	5♂ 5♀ 10N
		8-I-95			♂
Loving Creek	Rapides	30-X-93	31°12.00'N 92°34.40'W	T3N R2W S28	♂ 2N
		7-I-95			♂ ♀

Voucher specimens have been deposited in the National Museum of Natural History, in the Louisiana State University Insect Collection, and in the author's personal collection.

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